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A year of COVID-19 pandemic in Turkey: knowledge level, attitude and perspective of pregnant and postpartum women

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Abstract

Objective: This study assessed the knowledge level on COVID-19, attitudes towards preventive measures, perspectives on education in pregnant and postpartum women.

Methods: The online questionnaire was designed included 19 questions (demographics, knowledge, attitudes, perspectives on COVID-19).

Results: 316 out of 320 subjects (98.7%) completed the questionnaire. The knowledge level on transmission respiratory route / unhygienic environment was 47.1%/42.6% for pregnant, 47.3%/34.8% for postpartum women. The most frequent clinical symptoms, pregnant women answered 30.6% 'fever', 26.2% 'cough', 2.6% answered 'asymptomatic'. 44% of the postpartum women were informed about the possible findings in infants. 62.3% of the pregnant women did not know the poor pregnancy outcomes. 60.1% of the pregnant, 54.5% of the postpartum women were afraid of virus transmission, possible poor outcomes. Positive attitude towards preventive measures during/after pandemic was detected in 100%/95.8% of the pregnant, 99%/99% of the postpartum women. No statistically significant difference was detected between the education level and the method of learning information in both groups (p=0.363, p=0.672). The way of acquiring knowledge 69% media and 29.1% physician for pregnant women, 54.3% media and 43.4% physician for postpartum women. Positive perspective on education was detected in 84.9% and 79.8% of the pregnant and postpartum women, respectively.

Conclusion: Pregnant-postpartum women are still at risk from the COVID-19 pandemic. There is not any curative treatment for these women. The importance of the preventive measures have still kept on. Correct and current information were explained by healthcare workers to these patient groups for understanding COVID-19 effects on the mother, fetus, newborn and performing the preventive measures with conscious.

Keywords: Attitude, Coronavirus, knowledge, pregnancy, postpartum period.

Özet: Türkiye'de bir yıllık COVID-19 pandemisi: Gebelerin ve postpartum kadınların bilgi seviyeleri, tutumları ve bakış açıları

Amaç: Bu çalışmada, gebelerde ve postpartum kadınlarda COVID-19 bilgi seviyeleri, önleyici tedbirlere yönelik tutumlar ve eğitime yönelik bakış açıları değerlendirilmiştir.

Yöntem: On dokuz soru içeren çevrim içi bir anket tasarlanmıştır (demografik bilgiler ve COVID-19'a yönelik bilgi, tutum ve bakış açıları).

Bulgular: Anketi 320 katılımcının 316'sı (%98.7) tamamladı. Solunum yolu / hijyenik olmayan ortam bulaşmasına yönelik bilgi seviyesi gebelerde %47.1/42.6 ve postpartum kadınlarda %47.3/34.8 idi. En yaygın klinik semptomlar için gebelerin verdiği yanıt %30.6 ile "ateş", %26.2 ile "öksürük" ve %2.6 ile "asemptomatik" idi. Postpartum kadınların %44'ü bebeklerde olası bulgular hakkında bilgiydi. Gebelerin %62.3'ü kötü gebelik sonuçlarını bilmiyordu. Gebelerin %60.1'i ve postpartum kadınların %54.5'i virüs bulaşından ve olası kötü sonuçlardan korkuyordu. Pandemi esnasında/sonrasında önleyici tedbirlere yönelik olumlu tutum gebelerin %100/%95.8'inde, postpartum kadınların %99/%99'unda tespit edildi. İki grupta da eğitim seviyesi ve bilgi öğrenme yöntemi arasında istatistiksel olarak anlamlı bir fark bulunmadı (p=0.363, p=0.672). Bilgi edinme yöntemi gebeler için %69 ile medya ve %29.1 ile hekim iken, postpartum kadınlar için %54.3 ile medya ve %43.4 ile hekimdi. Eğitime yönelik olumlu bakış açısı gebelerde ve postpartum kadınlarda sırasıyla %84.9 ve %79.8'di.

Sonuç: Gebeler - postpartum kadınlar hala COVID-19 pandemisi için risk altındadır. Bu kadınlar için herhangi bir iyileştirici tedavi bulunmamaktadır. Önleyici tedbirlerin önemi hala devam etmektedir. COVID-19'un anne, fetüs ve yenidoğan üzerindeki etkilerini anlamaları ve önleyici tedbirleri bilinçli şekilde uygulamaları için sağlık çalışanları tarafından bu hasta gruplarına doğru ve güncel bilgiler açıklanmıştır.

Anahtar sözcükler: Tutum, Koronavirüs, bilgi, gebelik, postpartum dönem.

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Introduction

The Novel Severe Acute Respiratory Syndrome Coronavirus (SARS- CoV-2) and the disease its causing in humans, Coronavirus Disease-2019 (COVID-19) was first detected in December 2019 in Wuhan, China, and a pandemic was declared in March 2020 by World Health Organization (WHO) as it spread like a wild-fire.[1]

Coronavirus is spread from person to person by droplet transmission and contact of contaminated surfaces with mucous membranes.[2] The disease causes mild from severe respiratory tract infection in the population.[3] As there is no curative treatment or preventive vaccination for pregnant and postpartum women yet, WHO recommends hand washing and hygiene, mask and social distance.[4]

Pregnant women are still high risk patients for COVID-19 in terms of antenatal, postpartum period and newborn a year of pandemic.[5] Current data show that pregnant women need more intensive care and mechanical ventilation compared to the normal population, and also COVID-19 aggravates the existing comorbidities in pregnant women, and newborn infants require 25% more intensive care support.[5,6]

In the latest literature, there have been reported related to COVID-19 and poor pregnancy outcomes such as abortion, vertical transmission, premature rupture of membranes, severe oligohydramnios, increased rates of premature delivery and cesarean section in the last trimester.[3,5,7–9] Moreover, it has been similarly found that viral infections may cause autism in children in the long term, and in animal studies, schizophrenia and neurosensory deficit.[10,11]

Currently, there were identified Coronavirus variants mutation in the worldwide so pandemic spread rapidly.[4] Therefore, it is highly important that pregnant women are informed and aware in the fight against COVID-19. At this point, current and accurate information related to COVID-19 were given by healthcare workers to these women have a very significant importance.[12] However, there is not enough data in the literature involving the knowledge level and behaviors of these women about COVID-19.[12] Our study aimed to assess firstly knowledge level about COVID-19 and preventive measures and secondly, perspectives on education in pregnant and postpartum women during a year of COVID-19 pandemic in Turkey.

Methods

This cross-sectional, descriptive questionnaire study was performed in July 2020, the fourth month of the outbreak in our country based on the first case seen in March. Healthy pregnant and postpartum (first day) women admitted to Uşak Training and Research Hospital, Obstetrics and Gynecology Outpatient Clinic were included into the study. Patients with COVID-19 diagnosis or suspicion were excluded from the study. Informed consent was obtained from all of the patients.

The small number of such studies about knowledge and behavior of pregnant and postpartum women related to COVID-19 for citation in July were taken in consideration and the questionnaire was designed based on a small quantity of specific articles, obstetrics and pediatricians contributions. All participants answered the questions at once. Answering duration was designated to be five minutes.

The questionnaire included 19 questions. The first five questions were about demographics, the next nine questions were about the knowledge level on pregnant and postpartum women about COVID-19, and the last five questions were about both groups' attitudes towards the preventive measures and perspectives on education. The questions were designed to be multiple-choice, open-ended and yes/no questions (**Appendix 1**).

This study was approved by the Turkish Ministry of Health with the number of 2020-05-08T16_40_03 and by the Clinical Trials Ethics Committee, Faculty of Medicine of Uşak University on 22.07.2020 with the decision number of 45.15.21.

Sample numbers were calculated by this formula:

$$n = t^2pq/d^2$$

n: number of patients to be sampled; **t:** the theoretical value found according to the t table at a certain level of significance; **p:** frequency of appearance of the event under consideration; **q:** frequency of occurrence of the event examined; **d:** sampling error accepted according to the incidence of the event.

$$n = 1.96^2 \times (0.5 \times 0.5) / 0.055^2 = 317$$

t value for 95% CI t=1.96, p=0.5, accepted sampling error; d= 0.055 and calculated sample number was found as 317.

Statistical analyses were performed using NCSS (Number Cruncher Statistical System) 2007 (Kaysville, UT, USA) software. Descriptive statistical methods

(mean, standard deviation, median, frequency, ratio, minimum, maximum) were used for the assessment of study data with chi-square test used to determine the relationship between the qualitative data. Significance was assessed at $p<0.05$.

Results

The questionnaire was completed by 316 of 320 (98.7%) total subjects. While 212 of the participants (67.0%) were pregnant, 104 of them (32.9%) were postpartum women.

The demographic data of the study subjects have shown in **Table 1**. In pregnant group, the mean gestation week of the patients was 22.22 (5–40±10.61). All post-partum women were on postpartum first day. For the educational level, 16.5% of the pregnant women (n=35) were primary school graduates, 31.1% (n=66) were secondary school graduates, 32.1% (n=68) were high school graduates, and 20.3% (n=43) were university graduates; the respective values for postpartum women were 23.1% (n=24), 43.3% (n=45), 23.1% (n=24), and 10.6% (n=11).

The knowledge level on COVID-19 in pregnant women has been shown in **Table 2**.

For the knowledge on transmission route of Coronavirus, 47.1% of the patients answered 'respiratory', 42.6% answered 'unhygienic environment', 0.8% answered 'food', and 4.1% answered 'all' with 5.4% of the patients reported that they don't know.

For the knowledge on clinical symptoms of Coronavirus, 30.6% of the patients answered 'fever', 26.2% answered 'cough', 20.9% answered 'sore throat', 5.9% answered 'diarrhea and vomiting', 7.5% answered 'headache and joint pain', 2.6% answered 'asymptomatic', 2.4% stated that all of them may be seen, and 3.9% stated that they don't know.

For the knowledge on intrauterine transmission of Coronavirus to the fetus, 71.7% of the subjects answered 'yes', 24.5% answered 'no', and 3.8% stated that they don't know.

For the knowledge on transmission of Coronavirus to the infant during the delivery, 26.4% of the subjects answered 'yes', 67% answered 'no', and 6.6% stated that they don't know.

Table 1. Demographic data of pregnant and postpartum women.

Demographic data	Pregnant (n=212)	Postpartum (n=104)
Age (Max–min± SD)	26.36 (16–42±5.47)	26.05 (16–40±5.21)
Week of gestation (Max–min± SD)	22.22 (5–40±10.61)	-
Neonatal day (Max–min± SD)	-	1 (1–1±0)
Pregnancy (Max–min± SD)	2.17 (0–7±1.18)	1.97 (1–7±1.09)
Parity (Max–min± SD)	.15 (0–5±1.11)	1.92 (1–7±0.97)

Table 2. Knowledge level on COVID-19 in pregnant women.

Questions	Pregnant (n=212)	%
How is Coronavirus transmitted?		
Respiratory route	114	47.1
Unhygienic environment	103	42.6
Food	2	0.8
All	10	4.1
I don't know	13	5.4
What are the symptoms of Coronavirus?		
Fever	155	30.6
Cough-breathing difficulty	133	26.2
Sore throat	106	20.9
Diarrhea-vomiting	30	5.9
Headache-joint pain	38	7.5
Asymptomatic	13	2.6
All	12	2.4
I don't know	20	3.9
Does Coronavirus affect the unborn child?		
Yes	152	71.7
No	52	24.5
I don't know	8	3.8
Do infants contract Coronavirus during delivery?		
Yes	56	26.4
No	142	67.0
I don't know	14	6.6
Does Coronavirus lead to unfavorable outcomes such as abortion or premature delivery during pregnancy?		
Yes	59	27.8
No	132	62.3
I don't know	21	9.9
Is there a medication or vaccine for definitive treatment of Coronavirus?		
Yes	42	19.8
No	160	75.5
I don't know	10	4.7

About the effect of Coronavirus on pregnancy outcomes, 27.8% answered 'yes', 62.3% answered 'no', and 9.9% stated that they don't know.

While 19.8% of the participants stated that there is a definitive treatment and preventive vaccine for this disease, 75.5% stated there is not, and 4.7% stated that they don't know.

The knowledge level on COVID-19 in postpartum women has been shown in **Table 3**.

For the knowledge on transmission route of Coronavirus, 47.3% of the patients answered 'respiratory', 34.8% answered 'unhygienic environment', 1.8% answered 'food', and 9.8% answered 'all' with 6.3% of the patients stated that they don't know.

For the knowledge on possible symptoms of Coronavirus in infants, 26.4% of the subjects answered 'fever', 20.8% answered 'breathing problem', 5.6% answered 'diarrhea-vomiting', 0.8% answered 'refusing to breastfeed', 44% stated that all of these may be seen and 2.4% stated that they don't know.

For the knowledge on definitive treatment and preventive vaccine of Coronavirus in infants, 17.3% of the subjects answered 'yes', 69.2% answered 'no', and 13.5% answered 'I don't know'.

Table 3. Knowledge level on COVID-19 in postpartum women.

Questions	Postpartum (n=212)	%
How is Coronavirus transmitted?		
Respiratory route	53	47.3
Unhygienic environment	39	34.8
Food	2	1.8
All	11	9.8
I don't know	7	6.3
What are the possible symptoms of Coronavirus in infants?		
Fever	33	26.4
Breathing difficulty	26	20.8
Diarrhea-vomiting	7	5.6
Refusing to breastfeed	1	0.8
All	55	44.0
I don't know	3	2.4
Is there a medication or vaccine for definitive treatment of Coronavirus in infants?		
Yes	18	17.3
No	72	69.2
I don't know	14	13.5

The attitudes towards preventive measures to avoid Coronavirus and perspectives on education in preg-

Table 4. Attitudes towards preventive measures for COVID-19 and perspectives on education in pregnant and postpartum women.

Questions	Pregnant (n=212)	%	Postpartum (n=104)	%
Preventive measures				
Do you follow the rules for mask, social distance and hand washing against Coronavirus?				
Yes	212	100	102	99
No	-	-	1	1
I don't know	-	-	-	-
Choose the option suits you best:				
The baby and I will not get the virus as I am young and healthy.	-	-	-	-
The baby and I will not get the virus as I follow the rules about mask, social distance, and hand washing.	77	33	48	42.9
I am afraid that my baby and I will get the virus and suffer the possible poor outcomes.	140	60.1	61	54.5
I don't know	16	6.9	3	2.7
When the outbreak gets under control:				
I will stop following all precautionary rules.	-	-	-	-
I will continue to be cautious until the outbreak is completely over.	203	95.8	102	99
I don't know..	9	4.2	1	1
Education				
How do you learn information about Coronavirus?				
Media	211	69	70	54.3
Television	133	43.5	41	31.8
Internet	78	25.5	29	22.5
Physician	89	29.1	56	43.4
My friends	4	1.3	2	1.6
I don't know	2	0.7	1	0.8
Do you want get detailed information about COVID-19 from healthcare professionals (specialist physician, midwife, general practitioner)?				
Yes	180	84.9	83	79.8
No	32	15.1	21	20.2
I don't know	-	-	-	-

Table 5. Relationship between the method of learning information and education level in pregnant women.

Education level	Method of learning information					p-value
	Television n (%)	Physician n (%)	Internet n (%)	Friends n (%)	I don't know n (%)	
Primary school	17 (8)	16 (7.5)	9 (4.2)	1 (0.5)	1 (0.5)	**0.363**
Secondary school	43 (20.3)	28 (13.2)	25 (11.8)	1 (0.5)	0 (0)	
High school	39 (18.4)	31 (14.6)	27 (12.7)	1 (0.5)	1 (0.5)	
University	34 (16)	14 (6.6)	17 (8)	1 (0.5)	0 (0)	

nant and postpartum women have been shown in **Table 4**.

%100 of the pregnant women and 99% of the postpartum women stated that they follow mask, social distance and hygiene rules.

60.1% of the pregnant women and 54.5% of the postpartum women stated that they are afraid of virus transmission and possible poor outcomes.

95.8% of the pregnant women and 99% of the postpartum women stated that they will continue to be cautious until the outbreak is completely over even if it gets under control.

69% of the pregnant women stated that they are informed about COVID-19 through media and 29.1% via their physician; the respective values in postpartum women were 54.3% and 43.4%.

84.9% of the pregnant women and 79.8% of the postpartum women stated that they want to get information about COVID-19 from healthcare professionals.

No statistically significant relationship was found between the education level and the method of learning information of pregnant and postpartum women (p=0.363, p=0.672). The relationship between the education level and method of learning information have been shown in **Tables 5** and **6**.

Discussion

The present study found that the knowledge level on transmission route, clinical findings and poor pregnancy outcomes of COVID-19 in pregnant and postpartum women seems to be low. It was determined that both subject groups are worried about the possible negative outcomes of COVID-19 for themselves and their babies, and have positive attitude towards preventive measures. It was detected that, regardless of their education level, the subjects get their information about COVID-19 through media; however, they want to receive education on this matter from healthcare professionals.

Coronavirus infection has still rapidly spread all around the world. The clinical findings of the disease are fever, cough, myalgia, headache, diarrhea, some patients may experience atypical findings including nasal congestion and loss of taste.[3,13] The most frequent findings in pregnant women are fever (40%) and cough (39%).[5] But in a recent meta-analysis including 13,118 pregnant women and 83,486 women of reproductive age, it was reported that, in fact, fever (OR: 0.43) and myalgia (OR: 0.48) are seen less frequent compared to the non-pregnant women and this means that the rate of asymptomatic cases can be higher.[5] Infectivity and viral load of the asymptomatic carriers are the same as symptomatic

Table 6. Relationship between the method of learning information and education level in postpartum women.

Education level	Method of learning information					p-value
	Television n (%)	Physician n (%)	Internet n (%)	I don't know n (%)	All n (%)	
Primary school	8 (7.7)	12 (11.5)	8 (7.7)	1 (1)	1 (1)	**0.672**
Secondary school	18 (17.3)	27 (26)	10 (9.6)	0 (0)	0 (0)	
High school	12 (11.5)	10 (9.6)	7 (6.7)	0 (0)	1 (1)	
University	3 (2.9)	7 (6.7)	4 (3.8)	0 (0)	0 (0)	

cases; however, personal protective measures are not prioritized as much.[14] Asymptomatic cases may be in incubation period, have symptomatic disease, have subclinical infection or be chronic carrier, and surgical intervention performed during the asymptomatic COVID-19 infection or incubation period will worsen the course of the disease.[15,16]

Our study found that the knowledge level on transmission route (respiratory: pregnant women 47.1%, postpartum women 47.3%) and clinical findings (fever 30.6%, cough 26.2%, asymptomatic 2.6%) of COVID-19 in these women is low. Regardless of their education level, the subjects get information about COVID-19 through media rather than healthcare professionals (69% of pregnant women, and 54.3% of postpartum women). This may explain the low knowledge level. Similarly, in a questionnaire conducted in Nigeria in 430 pregnant women, it was found that the information source is media in 82% of them and they are not informed about COVID-19 symptoms (fever 43%, cough 43%).[17] But differently, in a questionnaire conducted in Iran in 225 pregnant women, the mean knowledge level of the pregnant women who get information from healthcare professionals was found to be higher (obstetrician 88.87±5.35, television 84.80±7.76).[18]

The findings of COVID-19 in newborns include fever, tachypnoea, tachycardia, respiratory distress, vomiting-diarrhea and lethargy.[19] Allotey et al., in their recent meta-analysis, found intensive care need rate 25% and 6 neonatal deaths in 13,118 newborns of COVID-positive pregnant women.[5,20] In another series, neonatal mortality was reported 0.2%.[21] While neonatal mortality rate is low, the rate of intensive care need is high in these infants, and in our study, postpartum women have a low level of knowledge on newborn complications and it may explain that these women are healthy and their newborns are few days old.

In the literature, it was reported that angiotensin converting enzyme-2 (ACE 2) receptors are present in placenta, trophoblast, endothelium and villi, therefore, vertical transmission is possible.[21] Moreover, endothelial damage has been demonstrated in the placental vessels of mothers with COVID-19, and it was stated that this may lead to conditions including preeclampsia, premature delivery and growth retardation.[21] Vivanti et al. demonstrated that Coronavirus transmission through placenta in pathological studies.[9] Similarly, in a review by Koltyar et al. evaluating 936 newborn infants with COVID-19, the rate of Coronavirus immunoglobulin M (IgM) positivity in neonatal serology was 3.7%. IgM is produced during the acute phase and cannot cross the placenta, so the detection of IgM in newborns was considered an acute infection.[22] Similarly, Oncel et al. evaluated 125 pregnant women with COVID-19 and they reported a polymerase chain reaction (PCR) positivity rate of 3.3% in newborns and poor obstetrics outcomes.[23] Differently, some studies related to pregnant women with COVID-19 detected prematurity, fetal distress, preterm delivery, perinatal death, high rates of caesarean section, but not vertical transmission.[20,21,24] Considering the maternal respiratory functions, preterm deliveries in COVID-19 are iatrogenic.[3] In the meta-analysis including 13,118 pregnant women, preterm delivery (PTD) was reported 17% and found to be correlated with pre-pandemic spontaneous PTD level of 6%.[5] In a questionnaire conducted in China with 161 pregnant and postpartum women of whom 79.6% are university graduates and get information from healthcare professionals, it was found that 41.9% of the subjects are not sure about the vertical transmission, and in a questionnaire conducted in Turkey with 172 pregnant women, it was found that 76% of the subjects did not know the disease causes birth defects and 64.5% did not know it causes PTD.[12,25] In our study pregnant women knew about the possibility of vertical transmission (71.7%), however, did not know about the poor pregnancy outcomes (27.8%), and this was linked to the subjects' education level (20.3% university graduates) and the fact that the method of learning information is media rather than healthcare professionals.

Coronavirus was not detected in genital secretions. However, as it may be excreted with feces, it was reported that the risk of vertical transmission during vaginal delivery is possible.[26] In our study, 67% of the pregnant women have the information that vertical transmission is not possible during vaginal delivery. However, SARS-CoV-2 has been found in the stools in one out of three non-pregnant COVID-19-positive patients, and the first potential vertical transmission, occurring during vaginal delivery in a COVID-19-positive pregnant woman with maternal rectal and stool swabs positive for SARS-CoV-2, has recently been reported.[27] In our study, the knowledge level on this one is low in pregnant women.

There is no evidence-based management protocol and curative treatment for this disease in pregnant women.[3,4,28] Medical treatment options for pregnant women include immunomodulator treatment, antiviral therapy, thromboprophylaxis within the context of expert's opinion, and in severe cases, convalescent plasma.[29,30] In newborns, treatment options include supportive care, avoiding unnecessary broad spectrum antibiotics, and in severe ARDS cases, surfactant.[31] In a study in Nigeria, 52% of the pregnant women stated that there is treatment for this disease and, in fact, it can be treated using chloroquine, a local medication, 88% stated there is no vaccine for it. In a study in Iran, 59.1% of the pregnant women stated that this disease can be treated using conventional flu medications and 55% stated that influenza vaccine may be protective against this disease.[17,18]

Differently from the literature, the pregnant and postpartum women in our study know that there is no definitive treatment or vaccine for this disease consistent with the recent data (75.5% of pregnant women, 69.2% of postpartum women).

In a questionnaire about the attitudes of pregnant women towards preventive measures against the virus conducted in China with 161 pregnant and postpartum women, a positive attitude was detected to be 58.9–90%, and in a different study by Aniwke et al. to be 66–82%.[12,17] Nwafor et al. detected that 60.9% of the pregnant women are informed about the preventive measures against COVID-19; however, 69.7% of them do not take these measures, and explained this situation with lack of education.[32] In a questionnaire conducted in Iran with 225 pregnant women, it was reported that the risk perception about the maternal-fetal outcomes positively affect the preventive measures (r=0.146, p=0.031), and Yassa et al. reported that the outbreak stress (80%) increases quarantine - preventive measures (87%/74%).[18,25] In our study, although the knowledge level on COVID-19 was low in these women, all of them stated that they are afraid of transmission and poor outcomes, and therefore will continue to take preventive measures even if the outbreak gets under control. This may be explained as the effect of the outbreak stress on the preventive measures.

Methods to get information about COVID-19 in pregnant women were detected as primarily media (82%) and television (82.7–71%) in the literature.[18,20,32] Similarly, the method of learning information in our study is media. However, it was stated in the studies that Internet and social media may lead to spreading misinformation, and therefore, healthcare professionals are crucial for conveying accurate and up-to-date information about COVID-19.[12]

In a year of COVID-19 pandemic in our country, there were given some of information about COVID-19 for pregnancy and lactating women by Turkish Ministry of Health as online education program at pregnancy school.[33] But currently all around the world, various Coronavirus mutations were identified and the short- and long-term effects of COVID-19 on pregnancy and newborns are not obvious.[4] In current literature; maternal death, stillbirth and PTD were detected high during pandemic and vertical transmission is not clear.[34,35] Also, there is not a proven treatment yet for pregnant and postpartum women.[4] Promisingly, various Coronavirus vaccines (mRNA, viral vector, inactive virus etc.) have been produced.[36] Today, WHO and American College of Obstetricians and Gynecologists (ACOG) recommends Coronavirus vaccine for high- risk pregnant and postpartum women, but there is no clear information about preventive and adverse effects of these vaccines, so most significant methods are still mask, social distance and hygiene.[4,36,37]

The present study has some limitations; first day of newborn was only included in this study because of pandemic for taking care of emergencies, we queried whether women have implemented protective measures, but further studies should focus on how they apply protective measures such as 1.5-m social distance, mask covering the nose and mouth completely, and washing hands at least 20 second, etc.

Conclusion

In order for preventive measures to be taken deliberatively during pregnancy and postpartum period with perceiving the maternal-fetal effects of COVID-19, the healthcare professionals should convey accurate and up-to-date information about the COVID-19 transmission, asymptomatic carriers, clinical symptoms, and the effect on pregnancy outcomes to these women. Healthcare professionals may provide verbal education during outpatient clinic exam. Moreover, educational videos and

brochures may be prepared and distributed to patients to watch and read.

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Appendix 1. The questionnaire for knowledge level, attitude and perspective of pregnant and postpartum women about COVID-19.*

PREGNANT WOMEN	POSTPARTUM WOMEN
Demographic data Age: Education level: ☐ Primary-Secondary ☐ Secondary school ☐ High school Pregnancy: Parity: Week of gestation: Vaginal delivery: Cesarean delivery:	*Demographic data* Age: Education level: ☐ Primary-Secondary ☐ Secondary school ☐ High school Pregnancy: Parity: Week of gestation: Vaginal delivery: Cesarean delivery:
Knowledge level How is coronavirus transmitted ☐ Respiratory route ☐ Unhygienic environment ☐ Food ☐ All ☐ I don't know	*Knowledge level* How is coronavirus transmitted ☐ Respiratory route ☐ Unhygienic environment ☐ Food ☐ All ☐ I don't know
What are the symptoms of coronavirus? ☐ Fever ☐ Cough-breathing difficulty ☐ Sore throat ☐ Diarrhea-vomiting ☐ Headache-joint pain ☐ Asymptomatic ☐ All ☐ I don't know	What are the possible symptoms of coronavirus in infants? ☐ Fever ☐ Breathing difficulty ☐ Diarrhea-vomiting ☐ Refusing to breastfeed ☐ All ☐ I don't know
Does coronavirus affect the unborn child? ☐ Yes ☐ No ☐ I don't know	
Do infants contract coronavirus during delivery? ☐ Yes ☐ No ☐ I don't know	Is there a medication or vaccine for definitive treatment of coronavirus in infants? ☐ Yes ☐ No ☐ I don't know
Does coronavirus lead to unfavorable outcomes such as abortion or premature delivery during pregnancy? ☐ Yes ☐ No ☐ I don't know	*Education* How do you learn information about coronavirus? ☐ Media ☐ Television ☐ Internet ☐ Physician ☐ My friends ☐ I don't know
Is there a medication or vaccine for definitive treatment of coronavirus? ☐ Yes ☐ No ☐ I don't know.	Do you want get detailed information about COVID-19 from healthcare professionals (specialist physician, midwife, general practitioner)? ☐ Yes ☐ No ☐ I don't know
Education How do you learn information about coronavirus? ☐ Media ☐ Television ☐ Internet ☐ Physician ☐ My friends ☐ I don't know	*Preventive Measures* Do you follow the rules for mask, social distance and hand washing against coronavirus? ☐ Yes ☐ No ☐ I don't know
Do you want get detailed information about COVID-19 from healthcare professionals (specialist physician, midwife, general practitioner)? ☐ Yes ☐ No ☐ I don't know	Choose the option suits you best: ☐ The baby and I will not get the virus as I am young and healthy ☐ The baby and I will not get the virus as I follow the rules about mask, social distance, and hand washing ☐ I am afraid that my baby and I will get the virus and suffer the possible poor outcomes ☐ I don't know
Preventive Measures Do you follow the rules for mask, social distance, and hand washing against coronavirus? ☐ Yes ☐ No ☐ I don't know	When the outbreak gets under control: ☐ I will stop following all precautionary rules. ☐ I will continue to be cautious until the outbreak is completely over. ☐ I don't know
Choose the option suits you best: ☐ The baby and I will not get the virus as I am young and healthy ☐ The baby and I will not get the virus as I follow the rules about mask, social distance, and hand washing ☐ I am afraid that my baby and I will get the virus and suffer the possible poor outcomes. ☐ I don't know	
When the outbreak gets under control: ☐ I will stop following all precautionary rules. ☐ I will continue to be cautious until the outbreak is completely over. ☐ I don't know.	

*Demographic data, education and preventive measures related questions are common in both questionnaires but knowledge level questions are different. After results were analyzed, common questions were shown in the same table, but different questions were shown in another table.